

## CLAIMS

1. A substrate for a magnetic recording medium, comprising a non-magnetic base and a non-magnetic coating layer formed to coat said base, said non-magnetic coating layer containing a metal which is capable of co-precipitating with Ni and has high affinity with oxygen.

2. A substrate for magnetic recording a medium according to claim 1, wherein said metal consists of one or more elements selected from P, Co, W, Fe, V, Cr, Mn, Cu, Zn, Mo, Pd, Sn, Re, Al, Zr, B, Ti, and Ta.

a 3. A substrate for a magnetic recording medium according to claim 1, ~~or 2~~, wherein said coating layer is any one of a Ni-P-Co amorphous film, a Ni-Ta-Co amorphous film, or a Ni-Ti-Co amorphous film.

4. A substrate for a magnetic recording medium according to claim 1, wherein said coating layer is represented by the composition formula of NiCoPM and said M consists of one or more elements selected from Ti, Zr, Hf, V, Nb, Mo, Ta, W, Al, and B.

5. A substrate for magnetic a recording medium according to

a ~~any one of claims 1, 3, and 4~~, wherein said coating layer contains 0.003-0.10% by weight of Co.

a 6. A substrate for a magnetic recording medium according to ~~any one of claims 1 to 5~~, wherein oxygen is intermittently adsorbed on the surface of said coating layer.

7. A substrate for a magnetic recording medium according to any one of claims 1 to 6, wherein the substrate provided with said coating layer is coated with an underlayer, a magnetic layer, and a protective layer, and a magnetic head runs while flying above said protective layer in a state of facing each other.

8. A magnetic recording medium comprising a substrate comprising a non-magnetic base and a non-magnetic coating layer formed on said base, and an underlayer, a magnetic layer, and a protective layer, which are formed on said substrate, said non-magnetic coating layer containing a metal which is capable of co-precipitating with Ni and has high affinity with oxygen.

9. A magnetic recording medium according to claim 8, wherein said metal consists of one or more elements selected from P, Co, W, Fe, V, Cr, Mn, Cu, Zn, Mo, Pd, Sn, Re, Al, Zr, B, Ti, and Ta.

a 10. A magnetic recording medium according to claim ~~1~~ or 8, wherein said coating layer is any one of a Ni-P-Co amorphous film, a Ni-Ta-Co amorphous film, or a Ni-Ti-Co amorphous film.

11. A magnetic recording medium according to claim 8, wherein said coating layer is represented by the composition formula of NiCoPM, and said M consists of one or more elements selected from Ti, Zr, Hf, V, Nb, Mo, Ta, W, Al, and B.

a 12. A magnetic recording medium according to ~~any one of claims~~ 8, ~~10, and 11~~, wherein said coating layer contains 0.003-0.10% by weight of Co.

13. A magnetic recording medium according to ~~any one of claims~~ 8 ~~to 12~~, wherein oxygen adsorbed on the surface of said coating layer serves as a pinning point for suppressing coarsening of ferromagnetic grains constituting said magnetic layer.

a 14. A magnetic recording medium according to ~~any one of claims~~ 8 ~~to 13~~, wherein oxygen is intermittently adsorbed on the surface of said coating layer and the adsorbed site of said oxygen is located at the grain boundaries of grains constituting said underlayer and, furthermore, said magnetic layer causes epitaxial growth based on said underlayer.

15. A magnetic recording medium comprising a substrate comprising a non-magnetic base and a non-magnetic coating layer formed on said base, and an underlayer, a magnetic layer, and a protective layer, which are formed on said substrate, said magnetic layer having a structure which does not include coarse ferromagnetic grains having a mean grain size which is two or more times larger than that of the ferromagnetic grains constituting the principal portion of the magnetic layer.

16. A method of producing a magnetic recording medium comprising a substrate comprising a non-magnetic base and a non-magnetic coating layer formed on said base, and an underlayer, a magnetic layer, and a protective layer, which are formed on said substrate in this order, said method comprising:

the pumping step of pumping out a film forming space in which said substrate is formed to a vacuum degree on the order of  $10^{-9}$  Torr or less, the cleaning step of introducing an inert gas into said film forming space to generate plasma and subjecting the surface of the coating layer constituting said substrate to a dry-etching treatment, and further comprising:

the exposure step of introducing a gas containing at least oxygen into said film forming space so as to attain a

pressure higher than the vacuum degree of said pumping step, and exposing the surface of said coating layer to a gas atmosphere containing said oxygen, and the film forming step of depositing said underlayer on the substrate subjected to said exposure step by means of a dry process.

17. A method of producing a magnetic recording medium according to claim ~~16~~, wherein a thin film containing a metal, which is capable of co-precipitating with Ni and has high affinity with oxygen, is used as said coating layer.

a 18. A method of producing a magnetic recording medium according to claim ~~16 or 17~~, wherein a thin film, which contains Cr as a principal constituent element, is used as said underlayer.

a 19. A method of producing a magnetic recording medium according to ~~any one of claims 16 to 18~~, wherein an Ni-P-Co amorphous film, an Ni-Ta-Co amorphous film, or an Ni-Ti-Co amorphous film is used as said coating layer.

20. A method of producing a magnetic recording medium according to any one of claims ~~16 to~~ 19, wherein the surface of said coating layer is exposed to an oxygen atmosphere under a predetermined pressure for a predetermined time so that the quantity of exposure of the surface of said coating layer

becomes 30 Langmuirs (provided that 1 Langmuir is  $1 \times 10^{-6}$  Torr·sec) or less in said exposure step.

21. A method of producing a magnetic recording medium according to ~~any one of claims 16 to 20~~, wherein the quantity of Co contained in said coating layer is adjusted within a range from 0.003 to 0.10% by weight.

22. A magnetic recording device comprising the magnetic recording medium of ~~any one of claims 8 to 15~~, a driving section for driving said magnetic recording medium, a magnetic head, and a moving means for moving said magnetic head relative to said magnetic recording medium.